GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, SEPTEMBER 27, 1893.

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Legislation Against Plant Diseases and Injurious Insects.

HOW far it is possible to arrest or control the spread of insects and of fungi injurious to vegetation is a subject with which every intelligent farmer and fruit-grower is familiar. It is discouraging for a man who takes energetic efforts to eradicate from his trees the black-knot or to protect his vines from mildew and his orchard from the coddling-moth, when his neighbor's vineyard is a breeding ground for disease germs, and his neighbor's orchard is a nest of insect pests. A successful effort to repel these enemies can only be made when an entire community addresses itself intelligently to concerted work. This may be helped in municipalities by ordinances. The local government of towns or counties in urgent cases can help to organize machinery and furnish immediate funds. But just as one man is powerless in this struggle unless his neighbor cooperates, so one municipality is powerless unless adjacent ones assist. Going one step farther, there is no doubt of the power of the state to legislate for the welfare of its own citizens, and there are laws in New Jersey which aim to exterminate the Cranberry-scald and other diseases, laws in Michigan and other states against the Peach-yellows, laws in New York against the black-knot of the Plum and Cherry, and laws in almost every state against the careless dissemination of seeds of noxious weeds like the Canada Thistle. But a law in New York has no effect in Pennsylvania, and the citizens of New York on the borders of other states, even if their own laws are enforced, are powerless to prevent invasion from hot-beds of disease and breeding-grounds of insects in another state. Commerce knows no state-lines, and so long as there is freedom of intercourse there is no help against the admission of contagions or of insect pests. If these things are to be held in check by law, therefore, state regulation alone is of no avail, and we must look for aid to some authority with a more comprehensive jurisdiction.

What can Federal legislation accomplish? The most complete reply we have seen to this question was made in a paper read before the Nurserymen's session of the recent Horticultural Congress in Chicago, by the Hon. Edwin Willits, Assistant Secretary of Agriculture. There is little to be added to what Mr. Willits said, and what follows is essentially an epitome of his paper. The Constitution contains only two clauses under which the power for remedial legislation in this direction can be claimed. In the eighth section of the first article Congress is authorized "to provide for the common defense and general welfare of the United States." This clause has received wide interpretation as the party in power chanced to feel inclined, and the question, What is the general welfare? has been answered in some remarkable ways. Indeed, so vague an inquiry might well puzzle law-makers. When the Colorado beetle first began to travel eastward, was the general welfare threatened, and had Congress a right to call upon the people to contribute money for its abatement, as they could be called upon to pay taxes in war for the common defense? Would it be right to compel orange-growers in Florida, whose groves are free from the white scale, to contribute money for the annihilation of this destructive insect in California? In such a case as this, how far can Congress assume rights which had previously belonged to states and individuals? Suppose the best remedy for an orchard infected with a fatal malady would be to dig it up, root and branch; what authority shall exercise this tremendous power of destroying private property for the public good? Who shall decide that the disease is contagious? Who shall condemn the property? Who shall destroy it? There would be little trouble in such a case if the state authorities co-operated with the Federal Government, as they did in most cases when Congress conferred upon the Department of Agriculture the power to eradicate pleuro-pneumonia. Agents of the department seized and slaughtered animals on private premises when they were adjudged to have the disease and paid the owner what they pleased. But, in this way, the disease was stamped out. Congress has authorized the General Government under this general welfare clause to investigate the Peach-yellows, Pear-blight and other forms of vegetable disease, as well as the habits of various injurious insects, for the purpose of discovering the best means of eradicating them. But it has never gone beyond the lines of investigation and the publication of the knowledge acquired for the general information. It seems idle to believe that Congress can ever confer upon a Federal agent the authority to enter upon a man's field and destroy his trees or their products in order to abate vegetable diseases or insect enemies.

In the same section of the Constitution we have quoted, Congress is empowered "to regulate commerce with foreign nations and among the several states." Now, since many diseases and pests are transmitted by commerce, this clause offers some hope. If a disease or an insect could be quarantined when it is first discovered, a large percentage of the injuries from them would be avoided. Congress has a right to say that no commodity shall be transported from one state to another, if it carries a contagious disease or a pestiferous insect. In pursuance of this power, Congress can appoint agents to execute the laws and inflict penalties for their violation. But this does not prevent transporting a diseased product from one part of a state to another part of the same state, and only a small proportion of the commerce of a state crosses its border. Freight, which crosses a state line, and is, therefore, under Federal jurisdiction, is mixed with freight to be delivered before the line is reached, and the products are hopelessly mingled. The Department of Agriculture can now attach all the meats of a slaughter-house, whether they were intended for local consumption or for foreign commerce, and can hold it until every carcass is examined, without regard to its destination. But, after all, this has little to do with the subject-matter. A Pear-orchard afflicted with blight has a fixed home, and cannot be the

subject of interstate commerce, although its fruit may be, and cions or nursery stock from it may be. In the same way trees infested with insects are beyond the reach of Federal authority, although fruit and cions from the same trees may not be. It seems, therefore, that so far as remedial law is concerned the state must be the active agent in suppressing disease and insect attacks, and the United States Government can only act efficiently as it is asked to cooperate in preventing the spread of danger from state to state. The Government can only prevent transmission; the states must assume the rights and power of extermination within their respective borders. But who shall decide that young nursery stock holds, or does not hold, the incipient germ which will develop into disease? California, for example, may pass a law prohibiting the importation of any affected nursery stock. If a nurseryman in this state makes sale of stock to a customer in California which he claims to be absolutely free from infection, the California authorities may prohibit this importation simply because it came from an infected district, just as states draw a quarantine line, across which no animal during certain periods can be brought from designated localities where disease prevails. Who is to decide whether this stock is justly held or not? And if many states set up quarantines of this sort it may compel an examination of all the nurseries in the land, and the expense of inspection and examination would soon become heavy enough to break down of its own weight.

It would seem, then, that direct legislation for the extirpation of insect pests and plant diseases must come from the states, and even then laws will be of little avail unless there is a wholesome public sentiment behind them and a high public spirit in individuals which shall reconcile them to the destruction of infected property. What the General Government can do, and what the State Government can do in the same direction, is to give liberal support to the scientific study of contagious diseases and pestiferous insects and to experimentation as to the best methods of eradicating them.

It is not exhilarating work to keep on repeating, year after year, that our forests are vanishing, and that unless something is done to arrest the destruction, they will quite disappear over large areas of what should always remain wooded land. But there is still need of reiterating this unpleasant truth, and we, therefore, publish in another column the view of a careful observer and a scientific man, Mr. H. J. Elwes, of England, in order to show how the situation presents itself to the eyes of one who is not an American. Mr. Elwes is not only an expert observer, but he is familiar with the forests and forest-conditions both of Europe and of India. He has studied this question for many years; he has visited our country before, and carefully noted what he saw then, and the letter he now writes is a record of what he saw in crossing the continent for the fourth time.

There seems to be little likelihood that Congress will be in any hurry to take action on this subject, and, after all, the best law would be of little value until there is a strong and living public sentiment behind it. The people of the country themselves will one day realize how closely their highest interests are w oven in with this question, and, when they do, they will find men to make such laws as they want, and find the power to enforce them.

American Parks.

LINCOLN PARK, CHICAGO.

THE same resolute energy in coping with physical obstacles, which is shown by Chicago in Jackson Park, has been displayed in reclaiming the waste sand-dunes at the north of the city, and making of them the cheerful pleasure-ground known as Lincoln Park. The thin, poor soil here prevents the growth of any large trees, and the surface is but slightly varied, but there is a compensation in the great expanse of lake front, which gives an unrivaled approach to the park, as well as the advantage of fresh breezes from the wide expanse of water.

Lakeside Avenue, which leads to this park, is a spacious boulevard, bordered on one side by a handsome stone sea-wall composed of granite concrete, against which the green curling waves dash into foam, and on the other by dignified dwellings standing apart, many of them encircled by lawns and trees and shrubbery. Along this drive the fine equipages of the city roll in gay procession of an afternoon, leaving behind the heat and dust of the smoky town. However this air may seem to the natives, it has to the sea-coast dweller the stimulating effect of that of a hill-country, and accounts for the fact that a visit to the World's Fair is not exhausting, but stimulating. Though Chicago is on the level of the lake, it has a decided elevation above the level of the Atlantic, since the journey to it is all the way uphill from the mouth of the St. Lawrence; and while the city's smoke makes respiration rather difficult within its confines, once outside of it the lift of the atmosphere is apparent even in summer weather.

To the poor this easy access by car and steamboat to such a great draught of freshness as Lincoln Park affords, is of untold value. They throng hither in great numbers on Sundays and holidays to look at the animals, of which there is a fine collection, or to wander under the trees, or along the stone-paved beach with fishing-rods and picnic baskets.

With great foresight the city of Chicago reserved to itself before 1850 a large tract of land along the lake, which it laid out in cemetery lots. In 1864 these were abandoned at the suggestion of the residents and property-owners of north Chicago, and in 1865 the land was set apart by an ordinance for use as a public park, to be called by the name of the martyred President. An appropriation of $10,000 was made for its improvement, followed by additional sums in succeeding years. In 1867 all the land owned by the city north of Fullerton Avenue and east of Lakeview Avenue was added to Lincoln Park, and in 1869 five commissioners were appointed for a term of five years, one of whom, General Joseph Stockton, still holds the position, after nearly a quarter of a century's service. From time to time more land was acquired and improved, until now, upon the completion of the outer drive, from Fullerton Avenue to Diversy Avenue, there is a total of four hundred acres, with a frontage upon Lake Michigan of two miles and a quarter. Smaller lakes diversify its surface, covering over twenty acres of it; and there are ten miles of drives and eighteen miles of walks, while a hundred and forty acres of submerged land have been reclaimed, to be utilized in drives, lawns and boating-course. Some of the little ponds are planted with Water-lilies and other aquatic plants, among them the Victoria Regia.

The dunes form slight and pleasing variations of surface, and there is an elevation in Lakeview section known as Mount Prospect, which has been carefully treated with landscape-effects, a drive leading to its summit, and a winding bridle-path encircling its base, while two groves of Lindens, one of White Birch and one of Elm and Ash have been planted recently in its neighborhood.

As one enters the park from the Lake-shore drive the noble bronze statue of Lincoln, by Augustus St. Gaudens, bids fitting welcome to the visitor. No statue that I know has a more dignified approach and surrounding than this. It stands upon a low pedestal of granite in the centre of an elliptical stone platform sixty by thirty feet in area, partly surrounded by a granite bench and balustrade, so that it can be viewed from all sides, the platform being approached on the open side by six broad low granite steps. The familiar figure, in his habit as he lived, stands in front of a massive chair, sculptured on the back with the American eagle; one hand behind his back, the other grasping his coat in a natural attitude, and he seems to be addressing with great thoughtfulness and seriousness a listening audience. Upon the encircling wall of the platform are chiseled the solemn words of his last inaugural, "With malice toward none, with charity toward all," etc. And so life-like is the figure, so grand the character of the sad powerful face, that one almost seems to hear the words uttered by living lips. The trees rise behind the statue, and make a fine background harmonious with its dusky bronze and the soft gray of the granite accessories. The whole effect is of great dignity and impressiveness.

Other bronze statues are one of Schiller, erected by the residents of Chicago of German descent, a duplicate of the one standing at Marbach, in Wurtemberg, where he was born; a spirited figure of heroic size of La Salle; one of Linnæus, a gift of the Swedish-American citizens, and an equestrian statue of Grant, mounted on a pretentious construction like a fragment of a castle, overlooks the lake. There are several fountains, around one of which in an open part of the park is a pretty French parterre and a garden partly laid out in set

figures and encircled by grass walks, but on the other side of the drive-way there is a grassy glade bordered with trees and shrubberies, with a border of exceptionally well-grown old-fashioned flowers, which is very charming and attractive.

None of the trees in Lincoln Park are of large size, and they are planted in irregular groves without much attention to general picturesque effect. Their trunks, like other trees hereabout, have a peculiar blackness, due, probably, to the smoke of bituminous coal, which lends to even the modern houses of the city a dingy and ancient look. Under a former management the lower limbs have all been cut away, a mutilation which greatly annoys the present competent superintendent, who is endeavoring to remedy the loss as much as possible by planting shrubs to make a low screen of foliage.

There is a new Palm-house, around which are parterres brilliantly bedded with flowering plants, and at the proper season there are gay displays of hardy plants in the herbaceous borders. Terraces surround the new conservatories, and a broad walk and stairway are designed to lead visitors from its front entrance down to the flower-garden, of which there is a good view from the terraces. The plants are arranged as far as possible in natural positions, without benches, flower-pots or tubs. There is a fernery within, designed like a rocky dell, with a cascade tumbling into a pool below, while on the ledges in the faces of the moss-covered rocks are planted Ferns of various kinds. The large greenhouses are heated on a new system invented by the superintendent, Mr. Pettigrew, who is a mechanical engineer of ability, and the plants in these houses testify to his skill as a gardener. He has been particularly successful in growing Water-lilies, and the ponds under his charge contain many single aquatics and many groups which have no superiors.

Two great difficulties have been successfully overcome in the construction of this park—one, that of providing soil for the trees and shrubs to grow in, and the other, of protecting the land from the encroachments of the lake. The park in the beginning was but a succession of sand-dunes, with a swale or two intervening, the sand being washed and of the most sterile description. There was not enough good soil in the swales to cover the park with more than an inch of loam, and it is a constant effort to provide nourishment enough for the trees and to keep the grass green during the dry hot season. Every year, by the free use of compost, something is added to the thin surface of soil, but the sandy substratum quickly swallows up the nutriment and leaves the turf parched and brown. Constant sprinkling from distributing pipes does what it can to keep things fresh, and the park is supplied with engines of great pumping capacity, but in a dry summer the consumption of water has been known to amount to 1,700,000 gallons in twenty-four hours.

The inroads of the lake have been resisted by expensive constructions. In 1888 a massive sea-wall was completed at an expense of over $80,000, the wall being made of huge blocks of concrete, each weighing about ten tons. It extended nearly 3,000 feet, and is ten feet in height. There is also a stone-paved beach, which forms an effective resistance to the encroachments of the lake. Along this beach is a promenade of granite concrete sixteen feet wide, then a long parapet, and after that a wide drive-way between it and a turf-covered bank planted with trees and shrubs.

When the great difficulties of the task are considered, the beauty of Lincoln Park is surprising, and makes one respect more than ever the unconquerable zeal of the men of Chicago, and honor them for their regard for public comfort. This determination to have what they want is a marked feature of the Chicago character. As I first looked at the immense city lying along the lake, with its towering buildings dwarfing its spires, I could not help remarking that Chicago needs a hill to make its picturesque effect complete, to which my companion, who was acquainted with the town, replied, "You have only to convince the people of that, and they will make one." After seeing Lincoln Park one is convinced that the answer was scarcely an exaggeration.

Hingham, Mass. *M. C. Robbins.*

Cave Plants.

SOUTHERN KENTUCKY is a cavernous country. All the southern counties, especially Warren, are a network of caves, underground streams, and "sinks" or "sink-holes." A cellar is rarely excavated that a fissure in the limestone-rock is not found, and this often widens out into quite a sink, or at least a crevice, when the water passes from an underground stream.

A different growth of plants is to be found in the cave entrances and large sink-holes from that along the banks of streams. The White Baneberry I have found only in sink-holes, its red stems and white berries being a lively contrast to the deep greens and the shadows at the bottom of the sink. Pale Jewel-weed (Impatiens pallida) grows to a large size in the moist depths of these places. The plants are often five and a half feet high and the trunk as large as one's wrist. Scrophularia nodosa, Collinsonia Canadensis, or Rickweed, are commonly found here. Of the Ferns, Asplenium angustifolium is frequently seen in deep shade at the bottom of moist sink-holes. Cystopteris fragilis is common in the crevices of moist limestone-rock, while Asplenium ebeneum is in the rocks nearer the surface. Cliff Brake, Pellæa atropurpurea, is a well-known feature of cave entrances and sinks, growing on the limestone cliffs in crevices where no other plant can find a foothold, and Aspidium acrostichoides, a common Fern everywhere, is generally met with in the woods about the top of the sink.

Of the three most interesting sink-holes in Warren County, Kentucky, the largest, near Oakland, is of sufficient size and interest to give it a place on the county map. It is ninety feet deep, and the entrance is about forty feet in diameter. This is called Wolf's Sink, and is a natural wonder well worthy a visit. Oaks and many other large trees are growing from its depths; down the trunk of one of these there is constructed a rude ladder, the only way of reaching the bottom, as a perpendicular wall of limestone extends some thirty feet around the edge. One tradition in the neighborhood is that this is the ladder made and used by the Indians, while another, and more probable one, is that they used a Grape-vine in making the descent. Strange to say, the only Fern found here is Asplenium angustifolium. It grows in the greatest profusion and to an unusual size, many of the plants measuring four to five feet in height, and the fertile frond is even taller. The Baneberry gives a needed touch of color to the shady depths of the sink.

Another very interesting sink is "Cave Mill." A small stream that rises above ground several yards beyond, flows into the entrance of this sink and disappears. A mill has been built above, and this mars what would otherwise be a very picturesque spot. It has been also called Lost River, as the stream disappears under the large arched rock of the cave, extends underground a mile or more, and then reappears above ground, forming a creek that flows into Barren River. Hop-trees (Ptelea trifoliata) and Pawpaws, with many larger forest-trees, grow along the stream near the entrance, Hydrangea arborescens at the entrance, Pellæa atropurpurea and Asplenium cristata in the crevices of the rock above. Viper's Bugloss, Echium vulgare, and Cup-plant, Silphium perfoliatum, are near the entrance. Many spring flowers grow here, among others Anemone, Silene Virginica, Asarum and Wild Ginger.

The third sink is not as deep as Wolf's Sink, but the entrance is about as large in diameter. It is by the side of a road leading to the river, in a dense grove of trees, and so is in constant shadow. It is rather a gloomy spot, and has gained the reputation of being haunted among the superstitious negroes living near by. I tried to hire some half-grown negro children to climb down to gather the plants for me, but they refused, saying there were "haunts" there. There was a rank growth of plants about the top, and several species of Desmodium, Melothria pendula and Gerardia among the rocks above the entrance. Mats of Walking-leaf Fern, Baneberry and Scrophularia grew at the bottom of the sink. About the entrances of caves in the sandstone part of the county the most common species of Ferns are the Lady Fern, Aspidium spinulosum, var. intermedium, and A. marginale, Cheilanthes vestita and Asplenium pinnatifidum are also often found at these places.

Bowling Green, Ky. *Sadie F. Price.*

Notes on the Forest Flora of Japan.—XXII.

THE Chestnut-tree is widely distributed through the mountain-forests of Japan, and seems to have received some attention as a fruit-tree from the Japanese, who recognize a number of large-fruited varieties. Very large chestnuts appear in profusion in the markets of Aomori, and are said to be produced in the immediate neighborhood of that northern town. But the largest chestnuts of Japan, which equal in size the best marrons of southern Europe, are found in the markets of Kobe and Osaka. It is these Kobe marrons which are now sent to San Francisco in considerable quantities. Rein, whose book on the *Industries of Japan* contains the fullest and most exact account of Japanese rural economy which has yet been written, believed that the chestnut was less

used in Japan as an article of human food than in Europe, but I have never seen chestnuts offered in such quantities in the markets of any American or European city as in those of Tōkyō and other Japanese towns. The Chestnut-trees which we saw had the appearance of growing spontaneously; and we saw nothing like an orchard of these trees, which, so far as we were able to observe, are not planted near dwellings or temples or for shade. In Japan the Chestnut-tree grows as far north in Yezo as we went, and is scattered through the mountain-forests of Hondo, where it is most abundant at elevations of about 2,500 feet above the ocean, growing on steep slopes in small open groves or mixed with trees of other kinds. We saw no evidences that the Chestnut-tree grows in Japan to the noble dimensions it sometimes reaches in Europe and on the slopes of the southern Alleghany Mountains, and specimens more than thirty feet high, with trunks more than a foot in diameter, were rare in that part of the country which we visited. The Japanese Chestnut appears to be more precocious than the American tree, and saplings ten or twelve feet high only are often covered with fruit. The large-fruited northern form from the neighborhood of Aomori should be brought to this country, as it may be expected to support a greater degree of cold than the French or Kobe Marrons, and, therefore, to be available for cultivation much farther north here. By its introduction it is possible that marron-growing may become a profitable industry in states with climates as severe as those of Wisconsin, Michigan and New England.

As in eastern North America and in Europe, the Beech in Japan is one of the noblest trees of the forest; its range is similar to that of the Horse-chestnut, in the north appearing on the shores of Volcano Bay in Yezo only a few feet above the level of the ocean, and extending southward along the mountains of the other islands. It is, perhaps, the commonest deciduous tree of the mountains of Hondo, where, between 3,000 and 4,000 feet, or toward the upper limits of the deciduous forest, it sometimes covers wide areas, nearly to the exclusion of other trees, or sometimes grows mixed with Oaks, Chestnuts, and occasional Firs and Spruces. Trees eighty or ninety feet tall, with trunks more than three feet in diameter, are not uncommon. The fact that Beech-wood is little used by the Japanese, and the comparatively inaccessible situations where it is mostly found, account, no doubt, for the abundance of this tree in Japan and the existence of so many large individuals. This, the Asiatic form of the European Fagus sylvatica, is hardly to be distinguished from the European tree, which it resembles in every essential character. The variety Sieboldii (the Fagus Sieboldii of Endlicher) I looked for in vain, and I hazard the opinion that it will turn out to be a tree of the herbarium and not of the forest.

I can throw no light upon the Japanese Willows which abound at the north in numerous, continental, mostly shrubby, forms; they require more careful investigation than it was possible to give them during our hurried autumnal visit, when the flowers and fruit had disappeared. On the streets of Europeanized Tōkyō, Willows are now chiefly planted as shade-trees; they are the Weeping Willow (Salix Babylonica), an inhabitant of China and a favorite with the Japanese, and Salix erioicarpa of Franchet & Savatier, a species which we saw growing by river-banks on the Nagascendo, and which looks too much like Salix alba to be distinct from that species which might be expected to reach Japan. But the handsomest Willow we saw in Japan, and certainly one of the most beautiful of all Willows, is Salix subfragilis, which appears to be confined to Japan, where it was discovered in the neighborhood of Hakodate by Charles Wright. We were first struck by the beauty of this tree between Nikko and Lake Chuzenji, where there are a few specimens on the banks of the mountain torrent, which the road follows in ascending the mountains. It was at Sapparo, however, that this Willow appeared in its greatest beauty; here on the banks of streams Salix subfragilis forms trees at least fifty feet in height, with short stout trunks three or four feet in diameter, covered with thick, deeply furrowed bark, and stout branches which spread nearly at right angles, like those of an old pasture Oak. The leaves are oblong, acute, rounded at the base and coarsely crenulate-serrate; they are borne on stems an inch and a half long and are six or seven inches long, two or two and a half inches broad, dark green and lustrous on the upper surface and silvery white on the lower; the stipules are foliaceous, obliquely rounded, and rather more than half an inch across. This Willow appears to be one of the most desirable trees to introduce into our collections, and the only Japanese Willow we saw of real value, from a horticultural point of view.

Populus is poorly represented in Japan; the two species which are found in the empire are both of Old World types, and there is nothing which corresponds to the Cottonwoods, which in all the central and western regions of this continent line the river-banks. The Aspen of Europe appears in one of its forms in Japan (Populus tremula, var. villosa), looking, however, so distinct from the Aspen of Europe and continental Asia that it is hard to believe that it is not specifically distinct; it is the Populus Sieboldii of Miquel, the oldest name. This tree is not rare in southern Yezo, where it grows to the height of twenty or thirty feet, springing up in considerable numbers on dry, gravelly soil. We saw it in the greatest perfection on the plains south of Mori, on Volcano Bay, and less commonly on the mountains near Aomori in Hondo. Of the second species, the Populus suaveolens of Fisher, we encountered a few individuals in southern Yezo, where it is probably near the southern limit of its range, it being a northern tree of Saghalin and the Amour country. It is evidently only a form of the Balsam Poplar, which is found in all northern regions, where, especially in some parts of British America, it constitutes by far the largest part of the forest-growth. In Japan the Balsam Poplar grows to an immense size, and some individuals which we saw were certainly eighty and, perhaps, a hundred feet tall, with long trunks five or six feet in diameter, rising like sentinels high above the low, mostly second-growth, forests of southern Hokkaido. *C. S. S.*

New or Little-known Plants.

Inula grandiflora.

THIS handsome and hardy herbaceous plant, although known to botanists for nearly a century, appears to be extremely rare in gardens; it has found its way into those of the United States through the agency of Herr Max Leichtlin, who sent seeds to Professor Sargent several years ago.

Inula grandiflora, in cultivation here, grows to a height of eighteen to twenty-four inches; the stout stems are well clothed with large, thick elliptical-oblong dark green leaves, and late in June are crowned by solitary flowers five inches across, with narrow dark orange-colored rays. The illustration on page 406 of this issue displays the form and size of the flower; it is from a photograph made by Mr. James M. Codman, of Brookline, Massachusetts.

Inula grandiflora is an important addition to our available early-summer flowering hardy perennials; it is very hardy. The habit of the plant, which is bold without being coarse, is good; the flowers are large and of an unusual color, and they appear at the season of the year when few yellow-flowered Compositæ are in bloom.

It is a native of the alpine regions of the Caucasus.

Cultural Department.

Apples in Kansas.

THE great Wellhouse Orchard in Kansas, with its hundred and forty thousand Apple-trees, covering more than twelve hundred acres, has now for some years been a financial success, thanks to the practical skill of its proprietors. Our readers will be glad to hear some account of

the methods employed by this prosperous business concern, and we, therefore, publish the essential parts of the address delivered before the Horticultural Congress in Chicago last month by Mr. F. Wellhouse, since it is a record of actual experience:

Commercial orcharding has only been possible in this western country within the past twenty years. Previous to that time a few hundred bushels glutted the local market, and with no means of rapid transportation the sale of large quantities of fruit was out of the question. But now, with railroad facilities and the reduced cost of transportation, with but a small belt of the earth where apples can be profitably grown, it seems as if there is no likelihood that apple-culture could be overdone, or the price reduced below the cost of producton, conceding that supply and demand control prices.

The selection of varieties has much to do with insuring the financial success of the orchard. Out of several thousand varieties of Apples there are probably not more than a dozen that will pay in Kansas. The Missouri Pippin has, so far, paid us better than any other kind; it is a strong grower, comes into bearing early and produces heavy crops. The fruit is of good size for the first six or eight years, but after that the trees overbear and the apples are small and scabby; the tree is also defective in side-roots and is liable to be blown over.

Ben Davis will probably yield more first-grade fruit than any other variety grown by us, and has paid us better for the past five years than even the Missouri Pippin; the tree is exceptionally healthy and bears well. The apples are large, and fewer of them go into the cull-pile than of any other variety we grow. About the first thing generally said of the Ben Davis apple is that its flavor is not pleasing, and yet there are more of them grown here than any other variety, and the fruit always sells well. Two years ago a Baltimore firm bought from us twenty-two car-loads, all Ben Davis apples, although we urged them to buy part Winesap and Missouri Pippin. Three years ago our entire crop went east, and the Ben Davis was preferred, and brought as high a price as any except the Jonathan.

The Jonathan has paid us fairly well; the tree is exceptionally good, and is a fairly good bearer; the fruit is of extra quality, and brings twenty-five to fifty cents more a barrel than any other variety we grow. It has one serious fault; the fruit drops from the tree badly, although not to any great extent with us. The dropping begins about the time the apples should be picked; and by being careful to gather them in time we have been able to save the fruit in good condition.

The Winesap has been less profitable than the varieties already named; and much of the fruit had to be used for cider because of its small size.

Maiden's Blush has proved an excellent variety, but it ripens at a time when the markets are usually glutted, and has not paid well. York Imperial and Ganz have been substituted for for Winesap and Maiden's Blush in our recent planting.

For large commercial orchards we think it best to grow our own trees from the gratt. The grafting is done in the usual way. Pieces of roots about two inches long are used, and we graft into them a cion from eight to twelve inches long. The graft is thus set deep enough into the ground to root above the union of the root and cion, and produces a tree on its own roots, which we consider much better than to have the roots entirely below the union.

We set our grafts in the nursery in a different way from that practiced by most nurserymen. The stakes are placed about ten rods apart in line where it is intended to set the grafts, we then take the steel runners of a common two-horse corn-planter, detach the wheels and all gearing, leaving the tongue; with a good steady team we drive with the tongue in a line with the stakes, the driver riding on the runners and pressing them into the ground. These runners each cut a crevice of a uniform depth, and the rows can be run straight enough for all practical purposes. If the ground is in good order a lot of fine earth falls into the crevice after the runners have passed, through which the grafts can be pushed with ease. Our grafts are tied in bundles of fifty. Carrying a bundle of these in his left hand, a boy with his right hand gently presses a graft at a time into the crevice to the proper depth, and from six to eight inches apart in the row; boys soon become expert at this work. A man follows, stepping with a foot on either side of the row, thus firmly pressing the earth about the grafts. We have planted our grafts in this way for over twenty years, and think it a decided improvement over setting with a trowel.

The grafts set in nursery form require no attention for that season but to be kept clean, and this must be done with plow and hoe. When one year old we trim them to a single upright shoot, and during the second year cultivate and keep the ground clear from grass and weeds, and shape the top, heading them from one to two feet from the ground. If they have made a good growth they are ready to set in the orchard when two years old. We consider any good Wheat or Corn land suitable for an orchard. Apples grown on sandy land usually grow faster and mature earlier than those grown on clay soils, owing to the warmer nature of the sandy soil. A Philadelphia firm who came here two years ago would not buy any apples grown on sandy soil, claiming that they matured too early, and were too ripe when picked to keep well in cold storage. The best soil, to my mind, is that composed of about twenty to thirty per cent. of sand and seventy to eighty per cent. of clay; this is sufficiently porous for the surplus water to penetrate, and the clay helps to retain the moisture.

In the preparation of the soil we have found it a good plan to break raw prairie in May or June, cross-plow in the fall and again the next spring. If there is time it is best to grow one or two crops before the trees are planted. If old ground is used it should be put in such condition as would be considered good for any kind of grain. We run a digger under the trees in the nursery, cutting off the roots at a depth of eight or ten inches, and ten inches on either side; this is done early in the spring. As soon as the ground is in condition we lay off the space for the orchard by running light furrows east and west sixteen feet apart, and north and south thirty-two feet apart; running a furrow in line with stakes, we throw the furrow to the east, then turn and let the left-hand horse (we use a right-hand plow) walk in the furrow just made and throw this furrow to the west, leaving a strip from twelve to sixteen inches wide between the two furrows; we now turn and go another round and throw out this strip, running the plow ten inches deep, or about the depth the digger is run in the nursery; this should give a furrow ten inches deep and from twenty to twenty-five inches wide. We consider these furrows much better than holes in which to plant trees, and they are much more rapidly made.

In transplanting the trees from the nursery to the orchard we run a potato fork into the ground at the side of the tree, lift it out just as we would a hill of potatoes, and set it into the wagon with all the earth that will stick to the roots. In the orchard there are two men to each row. One man sets the tree in place where the east and west furrows cross the north and south and holds it, while the other man with a shovel throws fine earth around it. The man holding the tree tramps the earth firmly around the roots; he should always stand on the north side of the tree while tramping, as he nearly always leans the tree from him, and we like to have the tree inclined a little to the south or south-west. As soon as the trees are set out we throw the furrows shut by going one round with the plow, and in a week or two when the weeds begin to start we go another round, setting the plow so it will only take a few inches of soil, and run it a little deeper; this enables us to entirely cover the first furrow thrown in, and all the weeds that may have started; in a few weeks we repeat, cutting a few inches more and so on, until by midsummer we have a bed running the entire length of the row, elevated six or eight inches above the surrounding land and about eight feet wide. The space between the rows in a commercial orchard we cultivate in corn. The second year we commence cultivation by throwing the earth from the trees, and wind up by throwing it to them again; we repeat this system of cultivation four or five years until the trees come into bearing, when we seed down to clover. For cultivating the trees we use the Sherwood steel harness, which has no single-trees to bark the trees.

Among the enemies we have had to contend with are the round-headed borers. The only safe remedy we have found is to dig them out. The woodpeckers have assisted us very much in this work. The flat-headed borer has also done considerable damage, and has received the same treatment. The twig-borer has given us but little trouble. Rabbits worked great mischief for a time. We now use a small box-trap costing about fifteen cents each. Two of these to the acre protect our orchards from this troublesome pest. Mice have girdled many of our trees. We drop six or eight grains of corn soaked in a solution of arsenic at each tree and some in their runways. Canker-worms did fearful execution in our orchards until we secured suitable machinery for spraying; it is now easy to clean them out with a weak solution of arsenic. The same treatment is applied to tent-caterpillars, fall web-worms, leaf-rollers and the caterpillar of the handmaid moth. If there is fruit on the trees we clip off the twigs containing the nests of the fall web-worms and burn them.

One of the most difficult things we have had to contend with

in growing an orchard in Kansas was to get rid of our eastern horticultural education in regard to pruning. We were taught to trim the body of the tree up high enough so that a team could be driven under the limbs and to thin out the branches so that the sunlight could easily get into all parts of the top.

In Kansas there is so much sunshine and it is so intense at times that all parts of the body and limbs of our trees need to be shaded with foliage, or the bark is sure to be scalded if they are in feeble condition. It is this abundance of sunshine that enables us to produce such large crops of fruit of excellent quality, with a minimum amount of pruning.

We commence pruning our trees at one year old in the nursery and train one upright shoot; as the season advances we form the top, commencing at about one foot or a little more from the ground, and let lateral branches shoot out six or eight inches apart on all sides of the tree, always keeping a leading centre shoot. We continue this for four or five years, until the tree is trained into proper shape; after that we do but little pruning, except to cut off the water-sprouts.

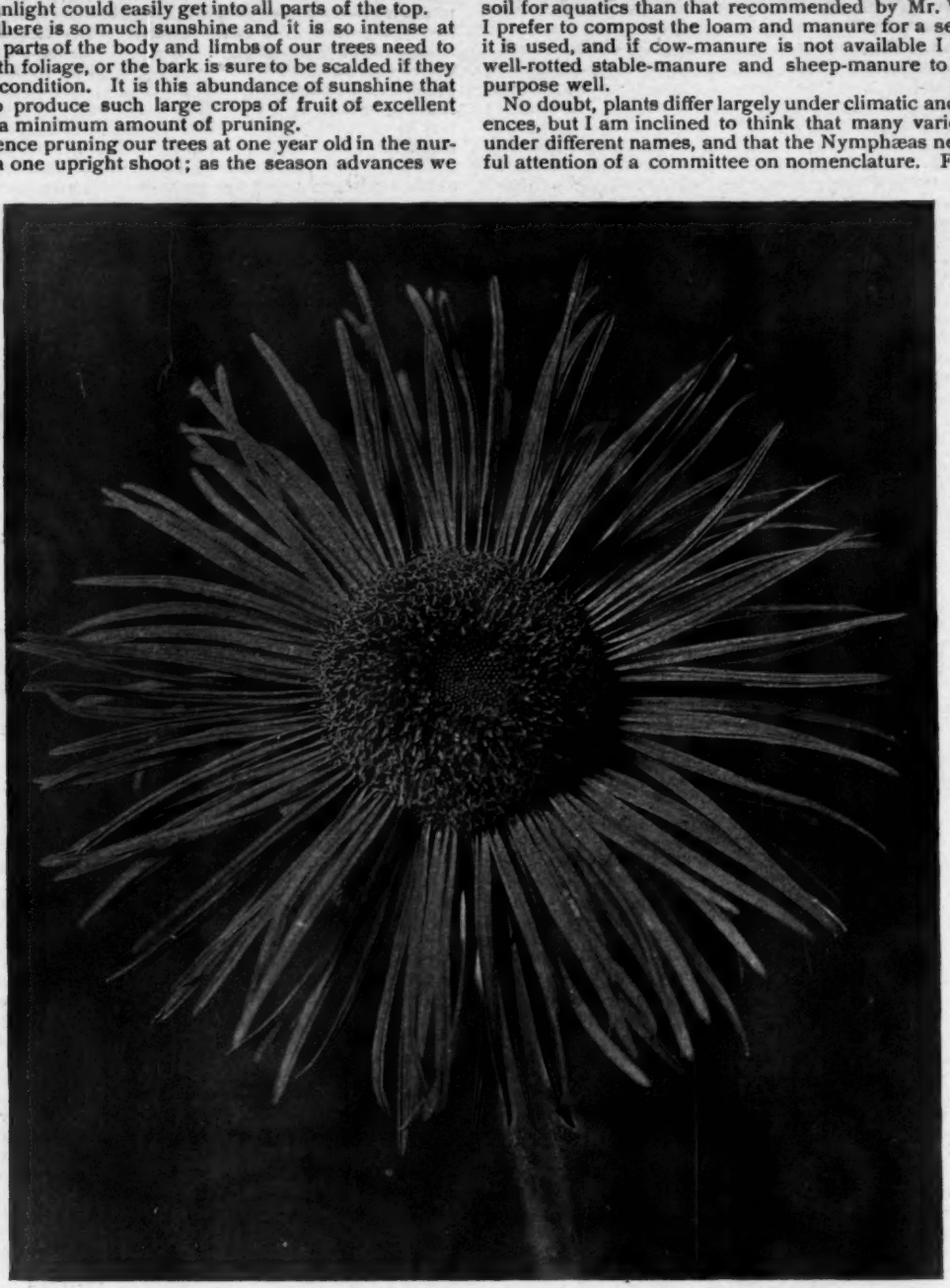

Fig. 61.—Inula grandiflora.—See page 404.

The Cultivation of Water-lilies.

ALL Americans who grow plants of this interesting class are glad to hear the experience of others, and especially of recognized authorities like your correspondent, Mr. Watson, of Kew. Mr. Watson's experience, however, as detailed in his letter in Garden and Forest for August 30th, differs in several particulars, as would naturally be supposed, from that of many expert growers in this country. I have found no better soil for aquatics than that recommended by Mr. Watson, but I prefer to compost the loam and manure for a season before it is used, and if cow-manure is not available I have found well-rotted stable-manure and sheep-manure to answer the purpose well.

No doubt, plants differ largely under climatic and other influences, but I am inclined to think that many varieties appear under different names, and that the Nymphæas need the careful attention of a committee on nomenclature. For example, among the plants described on page 366 is Nymphæa Sturtevantii, which differs materially from the plant known here by that name. With us, grown out-of-doors in full air and sunshine, it has foliage of a red-bronze color, sometimes almost crimson, and its very large flowers are a bright rosy red. As to the parentage of this grand plant, it is difficult to conceive that it is the offspring of Nymphæa rubra and N. dentata, although I will not assert that these are not its parents. Monsieur Marliac declares that he originated N. Laydekeri rosea in his establishment, but no amount of guessing will reveal its parentage. I can hardly conceive that N. Marliacea chromatella has any affinity to N. tuberosa, since there is no resemblance between the root, leaf or flower of the two

plants, if I have the true Chromatella variety. Of its parentage, however, I cannot make a guess, and Mr. Marliac keeps it a secret. Too much praise, however, cannot be given to this superb plant. The valuable varieties which are spoken of by Mr. Watson as N. Marliacea rubra and N. Marliacea rosea, if I can judge from his description, are known here as the varieties rosea and carnea, respectively. Certainly something should be done to remedy this confusion.

As to the tropical Nymphæas, they are grown here under the same conditions as hardy species are, except that they do not remain out all winter, at least, in this locality, although seedlings of the Stellata type appear in spring and produce flowers during the same season. So far as I know, these plants have never been grown in England, except in heated tanks under glass. It is impossible to describe the fascinating pictures which the Lily-ponds make here at early sunrise, with the noble flowers and buds of the Nelumbiums towering above their gigantic foliage. While the superb varieties of N. Lotus are yet in full splendor, the varieties of N. stellata are bursting their buds to continue the grand exhibition. The darkest form of N. stellata, Zanzibarensis, opens its flowers later, and so does N. Laydekeri, but these also close later, and no variety with which I am acquainted continues to open so long during the day as N. gigantea, far the grandest of all the many species of Nymphæa, especially of the blue varieties, and it succeeds admirably here under the same conditions as the Stellata class. With Nymphæa flowers of the Lotus varieties opening during the night, while the Nelumbiums and the hardy species of Nymphæa and their hybrids follow close after, we have a continuous display of flowers in varied shades of rich colors from dawn until the afternoon. Since the season of Water-lilies is a long one, it seems to me one of the charms of these flowers that they do not all remain constantly open day and night, like Marigolds or Geraniums; and we appreciate them more highly, because they unveil their full beauty only at certain hours. It might be desirable, as Mr. Watson suggests, to have a hardy blue variety, but on this side of the Atlantic there seems to be less need than there is in England for such a plant, since the varieties of N. stellata are of such easy culture here. Mr. Watson suggests that hybrids between the Lotus and Stellata type might have expanded flowers all day, but this is uncertain. I have flowered such hybrids, and many other crosses, and I have never yet found a plant which produced flowers that would remain open all day, nor have I found a hardy one with a blue flower.

My experience in wintering Water-lilies convinces me that the drying-off process is preferable. There is no risk in this practice, and it requires little space. A large amount of greenhouse staging would be necessary, if single specimens of twenty-five to fifty varieties were kept in tubs and had to be stowed away; and then all the varieties would not survive in a greenhouse temperature, and since neither varieties nor temperature are specified in Mr. Watson's note, such a point is calculated to mislead beginners in this country. Again, his advice to keep the seed dry in ordinary paper packets may be misleading also, if nothing is said in regard to varieties or temperature. The Stellata varieties will retain their vitality for three or four years in paper, provided they are kept cool and dry, but when exposed to the ordinary temperature of a seed-store or where fire-heat is used to maintain an agreeable temperature in winter, such seed is useless a second year. Some Nymphæa-seed I have never been able to germinate when kept dry even for a short time, while seeds of the same variety, not taken out of the water, or sown as soon as ripe, have germinated very freely. No mention was made of seeds of Victoria regia, but it is generally known, I believe, that the only safe way to keep them is in water. Even then they are difficult to preserve, and I presume the difficulty is that the seed at some time is subjected to a temperature so low as to injure its vitality.

West New Brighton, N. Y. *Wm. Tricker.*

Garden Notes.

HYPERICUM MOSERIANUM is among the best of the newer hardy plants, and its merits seem to have met with quick appreciation among gardeners. I have before referred to this hybrid, which was secured a few years ago by Mr. Moser, of Versailles, and further experience confirms my first impressions of its beauty and usefulness. It is probably only herbaceous, but is quick-growing, compact and has very neat foliage. The flowers are something over two inches in diameter, of a pure tone of yellow. The abundant pistils are tipped with violet. Messrs. Pitcher & Manda, who have introduced it here, had a fine show of the plants in one of their houses lately, and under glass the flowers were especially fine in color.

Crinum Kirkii, which has lately flowered planted out in the garden, is not a specially attractive species. Its very large round bulbs late in the summer produce a crown of leaves, outside of which strong reddish flower-scapes, an inch in diameter, push out. These support a cluster of about half a dozen Amaryllis-like flowers, white, with a stripe of dull beet-red in the centre of the petals. The fragrance is rather pleasing. Crinums are interesting bulbs with very varying characteristics, but most of them are plants for a warmer latitude than this, and they should be planted out where they can remain undisturbed and become thoroughly established to do their best. The suggestion in GARDEN AND FOREST that they be wintered in a cool house and used for garden-decoration, will scarcely answer in cases of such varieties as C. Americanum, which has a bulb like a section of a tree-trunk, or C. Powelli, whose bulbs could not be covered in less depth than a hogshead. C. Capense seems to be hardy with me, and I propose trying some of the other long-bulbed kinds outside in a warm border at a good depth as the best possible position for them. Such plants, if well established, would be striking ornaments to the garden.

Hybrid Montbretias are still in flower, and deserve an annual note, as the flowers are very distinct and particularly effective. There is a close resemblance among the Lemoine's varieties, they being mostly fiery shades of red and orange, the different named varieties bearing these in different proportions variously disposed. One can scarcely go amiss in ordering a selection of the named kinds. The corms are not reliably hardy here. They require somewhat generous treatment while growing and a moist position, where it is also sunny.

There is a pleasant tendency now to make more use of the perennial Asters, which, well grown, are very attractive at this season, and a relief from the prevailing yellows. The countless thousands of the Daisy-like flowers of the great bushes of these plants not only enliven the garden, but are useful for decorations. Good clear shades of purple should be selected. As for names no plants are more confused, and any list would be confusing. From Woolson I had a particularly fine white-flowered kind as A. longifolius, var. Lady Trevylian. This has abundance of pure white flowers in pleasing addition to the usual purplish type.

Dwarf Single Dahlias are at present quite the showiest plants in the garden. The new French strain of dwarf Dahlias are low stocky plants, which require no stakes, and produce great quantities of showy flowers of brilliant colors in infinite variety. I have had not only selfs in whites, reds and yellows, but these colors in a great variety of combinations, petals spotted, blotched and lined also in quaint effects. It is well to treat these plants as annuals; from seed sown in April strong stock may be secured for summer flowering.

Elizabeth, N. J. *J. N. Gerard.*

Mushrooms as a Side Crop.—In view of possible low prices for flowers next winter, Mr. Samuel Henshaw suggests, in the *Florists' Exchange*, that owners of commercial greenhouses would do well to grow Mushrooms as a side crop in order to tide them over a hard season. He states that Mushrooms are very steady in price, which is as high to-day as it was ten years ago, that the demand has never been fully met, and, indeed, that many large hotels would be glad to make a contract for a continuous supply during the winter at a fixed price, if they could feel sure of getting it. Florists have all the space and the conveniences that are needed for growing Mushrooms, and there is no need of building special houses. Every Rose-grower has abundance of waste room under his raised benches which is just suited to Mushrooms, if the drip is kept from soaking through. This space is now often wasted, and all that is needed is to spread the prepared manure upon the earth about a foot deep, with boards placed along the posts which support the benches, to keep the bed from spreading when it is beaten down. The best covering for such a bed is green sods turned grass-side down and beaten firm, but if these cannot be had, fresh soil will do. No extra coal is needed, for the temperature is about right, although occasionally a little too warm. The potting and packing sheds in large florists' establishments often contain heating-apparatus to make the whole comfortable, and there, too, are admirable places for Mushrooms, and there are always odd nooks and corners for a catch crop of this kind, since it is immaterial whether the location is light or dark, when it is not too dry. Open potting sheds, where the soil is prepared and stowed, are admirable places for piling and fermenting the manure and turning it to get rid of the extra heat and rank odor before

making the beds, and now is the best time of all the year to haul and prepare this manure before the cold sets in. There is time yet to get a crop ready for the heavy winter demand.

Mr. Eckford's Sweet Peas.—It has been a bad year for annuals generally in England, and we are consequently poor in many flowers which are usually a feature of the herbaceous border. Sweet Peas have been a failure at Kew and also at Chiswick. Mr. Eckford, however, exhibited in their season a beautiful collection of his newer varieties, which fully bore out his statement that in good soil and with a regular supply of water Sweet Peas are certain to succeed, however hot the weather may be. I noted the following varieties as the best selection, to my taste, out of some fifty named varieties shown: Emily Eckford, a most lovely blue, with the faintest shade of purple; Excelsior, bright cerise, large and well-formed flowers; Royal Rose, bright flesh-pink, a superb flower, both in form and color; Countess of Radnor, pale mauve, shaded with a darker mauve, a delicate, very attractive, color; Firefly, very similar to Excelsior, but richer, almost blood-red; Venus, a creamy white, with a blush tinge; Lady of Penzance, rich deep rose; Orange Prince, pale orange, flushed with scarlet. Mr. Eckford supplies seeds of all these in sealed packets, and guarantees them to come true.

Kew. *W. Watson.*

Correspondence.

American Coniferous Forests.

To the Editor of Garden and Forest:

Sir,—Having just returned from a trip to the west, I have read in your issue of June 14th, page 252, Mr. Robert Douglas' paper at the Nurserymen's Convention, and cannot but wonder at the apathy which is shown by the American people in general on the subject of the destruction of their forests. I have now crossed the continent by four different routes, and everywhere it is the same sad story. Wherever the railroads go the valuable timber is either burned or wasted, and nobody but a few of the more enlightened Americans seem to recognize that what Mr. Douglas says is true. I traveled with a gentleman of great ability, who was largely interested in lumber in the north-west, and who said that the best timber was nearly all gone in Minnesota, but that it was no use for lumbermen to try to save what was left, as the railways were burning it down a great deal faster than they could cut it. He told me that in Colorado there were no forests worth mentioning, and when I went there I found that, though from a European point of view, there were still large tracts of what we should call very valuable forest, yet fires were burning in all directions, and probably two-thirds of the coniferous timber in sight of the railroads was already destroyed. In the mountains, I learned that, owing to the exceptionally dry season, water was in places getting scarce, and that there was, in some cases, hardly enough in the rivers to supply the irrigating ditches below. At Leadville, which was surrounded by forest not many years ago, I was told that mining timber now had to be hauled fifteen miles. When I went across the boundary into British Columbia it was much the same thing, though in the damper valley of the Columbia the forests are less subject to burning, and notices were posted to warn passers-by against carelessness.

At Nelson, a new mining town in the Koutenay district, I rode for many miles through what had been magnificent timber, all burned, up to an altitude of about four thousand feet, except on the shady northern slopes. Along the line of the Canada Pacific, east of Revelstoke, it is the same story, and though much good timber is still left in places, yet on the east of the Kicking Horse Pass most of it is burned, and the young trees which sprang up after the first fires are again burned. I saw new ties being put in which were not above six inches on the face in some cases, and would not last more than five or six years, and quite small logs floating down the rivers in thousands to supply the saw-mills. I do not suppose that any one can form a correct judgment of what will be the future of all this western country, but I believe that a great deal of it which is habitable now will not be so after another fifty or a hundred years of such waste.

There is, no doubt, on the Pacific coast enough good timber to supply all North America for centuries, but what will it cost when it has to be freighted so far? And what will become of the drier parts of the country if irrigation is only possible for three or four months of the year? Garden and Forest has done its best for five years to bring all this home to the inhabitants of the United States, but as far as I could judge public opinion in the west is not more advanced than it was in 1887, when I was last there, and it will s on be too late to save anything but the most inaccessible forests from destruction.

Last year I went to one of the principal importers of timber in Gloucester, England, to see if I could get some really first-class lumber for building Orchid-houses. He told me that such a quality as they used to have forty years ago could not now be found. It was not a question of price, as there was not any. What is imported now is cut from smaller, quicker-grown trees and will not last. In consequence, pitch-pine is being used for horticultural buildings.

Andoversford, England. *H. J. Elwes.*

Notes from California.

To the Editor of Garden and Forest:

Sir,—The Californian season continues backward to the last. Hop-picking commenced in the Russian River fields August 28th, nearly two weeks after the usual time, but the crop is good. All fruit showed the same tardiness, along with a great yield; owing to the closeness of money, fruit is not bringing good prices. Much less than the usual quantity has been canned, as the canners are crippled for working capital. Prunes are of good quality, and the crop is fair on a greatly increased bearing acreage.

In the flower-garden I have not had success with some summer flowers that usually do well. Roses have also been poor here. On hundreds of good flowering bushes I have had few first-class roses. The bushes are healthy, but the roses lack size and fullness. The autumn flowering may possibly be better. I find nothing to equal the best Cannas for bedding-plants in California. They grow luxuriantly during our hot summers if sufficiently watered. It is not necessary to lift the roots in fall, as they winter with perfect safety in the ground.

I tried a few Tigridias last season, and this year experimented with quite a variety of Mexican bulbs, among them Tigridias, Bessera and Amaryllis. Nearly all flowered and all did well; I shall continue the experiments another season. The plantings were made about May 1st in a soil largely composed of sand. I shall not lift these this fall. The Tigridias were left in the ground last year and did much better this year than last. Calochortus Bonplandianus did not do well; this, I think, was due to want of proper treatment. These Mexican bulbs seem to have their season for growing and their growth cannot be hurried, even if warmth and moisture are supplied. Lilies have done well, as, indeed, all bulbous plants. L. Harrisii seems to lose its early-blooming quality if grown in ordinary climates a few years. I had a quantity of L. Harrisii and L. longiflorum from a reliable grower; these had been grown out-of-doors in California for several years, and they appeared to be identical in time of blooming and in every other respect. I have seen many thrifty specimens of L. Humboldtii, but a plant from a garden in the mountains here is the best which has come under my observation. From the bulb planted two years ago two heavy stalks were produced; one of these was injured and blighted, the other grew to a height of eight feet four inches. Forty-nine blossoms were perfected and about twenty-five buds blighted. I may add that the Lily is not a native of this part of California.

Ukiah, Calif. *Carl Purdy.*

A Tropical Plant-house.

To the Editor of Garden and Forest:

Sir,—Although a tropical plant-house may more properly be termed a winter retreat, it has charms in summer for all true lovers of plants, notably the effects made by the proper arrangement of choice foliage-plants. The tropical plant-house belonging to F. Simpson, Esq.. of Saxonville, Massachusetts, is at this time gorgeous with handsome and finely colored foliage plants, which, under the September sun and moist atmosphere, are putting on their winter dress. Crotons, Marantas and Dracænas are fast gathering their tints, and large Ferns are hardening their fronds. The lovely white and red veined Fittonias are spreading sheets of color in spaces set apart for them under the large Palms, and Selaginellas, green, golden and lustrous blue, everywhere. Among the many fine specimens I noticed were the graceful Ferns, Microlepia hirta cristata, Adiantum Farleyense, several huge Alsophilas and Dicksonias, as well as large plants of Dracæna Knœrkii, D. Rumphii and D. fragrans, with leaves extending to the ground-level; as well as many varieties of the beautiful tinted Dracæna terminalis. Caladiums are here very appropriately used, and in a large structure, such as this, with extensive vistas, they show off to much advantage. C. Cinnabarina is a delicate creamy white, with light green veins and pink markings. C.

Katzer, fine bright red, marbled with white. C. Duchartre, the most gorgeous of all, has large rounded foliage with light green centre and darker edging and red veins. Among flowering plants were some of the new Gesneria and Tydœa hybrids, with handsome foliage and fine spike of drooping orange-colored flowers, beautifully spotted with yellow.

Ixora coccinea and some of its fine varieties are evidently at home here, and graphically illustrate what these almost forgotten stove-plants could be made under proper cultivation. Their immense umbellate corymbs of orange-colored Bouvardia-like flowers were singularly effective in the setting of foliage-plants. On the wall of a cool-house near by are planted some of the best varieties of Rex Begonias. This is evidently their natural position. In light, spongy rotted moss, with no other fertilizer, they have made immense specimens, with leaves in many cases upward of two feet in diameter and with a lustre rarely seen. This may be accounted for partly by the fact that although plenty of root-moisture is available, no moisture is ever allowed on the leaves.

Wellesley, Mass. *T. D. H.*

The Columbian Exposition.

The Fruit Displays.

DURING the latter part of September the autumn fruits of the northern states are shown in great profusion. The rear wings of the Horticultural Building have never before looked so well, and the uniform excellence of the exhibits must silence criticisms of the pomological displays. Many of the northern states are not represented; the fault rarely lies with the fruit-growers, but is rather due to lack of funds, which, upon one excuse or another, have been diverted from horticultural interests.

After the display of citrous fruits from California, the Pacific north-west arrests the attention of visitors. Idaho, Oregon and Washington have held a prominent place from the first, although Oregon has exceeded the other two in the amount of fresh fruit exhibited. The fruits of this entire region are remarkable for their enormous size and high color, and particularly for the strange influence of climate which they show. All apples which, in the east, tend to be oblong in shape, show this tendency in a more pronounced degree here, and the apex becomes conspicuously ribbed and the calyx is usually larger. The varieties of apples which these states show are very largely familiar in name to eastern pomologists, though they are strange in appearance. Newtown Pippin, Blue Pearmain, Chenango and other old eastern apples grow to perfection beyond the Rockies.

The great interior region is admirably represented by Illinois, Kentucky, Missouri, Kansas, Nebraska, Arkansas and Colorado. Apples predominate, although pears and grapes are shown in variety. This great geographical region is the area of the comparatively coarser-grained apples of the Ben Davis, Janet, Rome Beauty and Pippin class, although many fruits of excellent quality are grown. The displays impress one with the great size of the specimens, and the prominence of the green and yellow under-colors. While red is prominent, it is of a coarser type than that seen in the apples of the north-west Mississippi valley, and, though deep, is rather dull, and is laid on in heavy splashes. The coloring usually lacks the fiery brilliancy of the apples of the north-eastern states and the delicate pruinose tints of Wisconsin and Minnesota. Arkansas has surprised visitors by the wealth of its apple display, and Kansas and Nebraska sustain their accustomed reputation. Canada is now making attractive additions to its fresh fruits, although still depending too much upon bottled fruits. The firm, hard, crisp apples of the Provinces and of Maine are now the best part of these exhibits.

The newer classes of Russian and other hardy fruits are shown in good variety by Iowa, Minnesota and Wisconsin, and they are all remarkable for the high and delicate color of the skin. This is especially true of the apples of Minnesota and Wisconsin, which are among the handsomest fruit ever seen in any exhibition. In these states and South Dakota crab-apples and native plums are particularly conspicuous. The large display from South Dakota is specially gratifying, and includes apples, grapes, native and other plums, and tomatoes. Many of the apples in the collection are unfamiliar to eastern growers; among well-known kinds are Ben Davis, Maiden's Blush, Plumb's Cider and Blue Pearmain. Most of these fruits are from the extreme south-eastern portion of the state.

A study of the fruit displays shows that New York makes the best exhibition, and the state has held this position throughout the Fair. The fruits are not only remarkably well grown, but are in great variety. Careful attention has been paid to nomenclature, arrangement, and to giving such incidental information as the intelligent visitor desires to have. The exhibit shows what is accomplished in one of the oldest states by thorough, and what may be called scientific, cultivation. There are many individual orchards in other states which are cultivated according to the best methods, but there is probably no other region of equal extent in America where good cultivation and careful attention to all the newest facts and discoveries are so universal as in New York state. The exhibits have shown graphically the results of spraying, a practice now common with all the best growers of the state. High fertilizing is also apparent in many of the samples, and varieties difficult to grow are shown in perfection. There are on exhibition remarkably handsome and clean specimens of Cranberry Pippin, Jonathan and Fameuse, from Mr. Geo. T. Powell, of Columbia County, east of the Hudson, and a conspicuous placard bears this legend: "These varieties are peculiarly liable to attacks of apple-scab, and are often entirely unsalable. These have been thoroughly sprayed with Bordeaux mixture and Paris green. High fertilizing accounts for the brilliant color of the fruit." The State Experiment Station at Geneva shows average specimens of the old White Doyenne, or Virgalieu, and Seckel pears, both sprayed and unsprayed, and the differences are remarkable. The exhibit shows that the good old Virgalieu, which has all but gone out of cultivation on account of disease, can be grown as good as ever with the use of the spraying-machine. New York excels in fruits of high excellence, and many of the famous dessert fruits are shown nowhere else.

Pears and grapes are especially conspicuous now. Of the former there are over one hundred varieties of superior quality, and about two hundred varieties of grapes. Of apples there are over 250 varieties. Among the interesting samples are seventy varieties of apples from St. Lawrence County, shown by A. F. Clark and John Cline. This is the northernmost county of the state and is generally thought not to be adapted to fruit-culture. All the finer kinds of berries, including about two hundred varieties of gooseberries, have been shown in season; and apricots, peaches, plums and other fruits have been displayed in perfection. New York differs from nearly every other state in having made no attempt to attract attention by mere displays of quantities of fruits or of unusual or conventional designs. The Michigan fruits, which now command attention, are very like the New York fruits in their natural features.

New Jersey is the only state from the Atlantic slope which makes a general display of autumn fruits.

BREVITIES.

The potato exhibit of New York in the Agricultural Building at Chicago is said to be the best potato display ever made in this country. More varieties have been shown at other fairs, as the number in this exhibit will probably not exceed 250; but the display shows different methods of treatment. The chief interest lies in the products of different amounts of seed. Many varieties were planted with one, two and three eyes in a hill, and an entire hill produced under each method, showing average yield, is displayed upon the tables. All the series seem to agree in affording fewer and larger tubers from the single eyes, and more and smaller ones from the cuttings with three eyes; yet the largest gross yield of merchantable product comes from the three eyes. In other words, a single eye does not give sufficient root-surface to set a large crop, and because of the few tubers, each one grows very large. The reduction of the number of eyes in a hill, therefore, amounts simply to a thinning process. The variety which is shown from the greatest number of counties, and which has given, altogether, the best yields, is Rural No. 2. There are 525 different exhibits in the entire collection.

A most remarkable collection of fancy Caladiums is now showing in the annex or propagating-house. These plants come from Mr. Lizt, of Rio Janeiro, and they probably constitute the most varied and interesting collection yet seen in this country. They are remarkable for the thinness of their leaves. Many of these are so transparent that ordinary handwriting can be read through them. In color they run from almost white, through many variegations, to a deep red approaching maroon.

Chicago, Ill. *L. H. Bailey.*

Notes.

The little Daphne Cneorum is now blooming almost as freely as it did in early spring, and its clusters of fragrant lilac flowers are especially pleasing at this season. Some-

times it is a troublesome plant to get through the winter, but if it survives at all, it often gathers strength for a season of autumn flowering, which makes it worth nursing through the summer, and yet it is a pity that it is not a little less susceptible to injury from cold, for it is one of the most desirable of all dwarf trailing shrubs.

The citizens of Plainfield, New Jersey, and visitors to that town have just now an admirable opportunity to judge of the decorative value of Clematis paniculata. The Casino in that town is beautifully draped and festooned with this rampant climber, the pillars of the porch being wreathed with the fragrant white flowers, which extend to the roof, where, in great profusion, they lie in relief against the dark shingles.

Mr. E. S. Carman, of the *Rural New Yorker*, thinks that the Nectar Grape, one of Caywood's introductions, is too little known. In this latitude it ripens with Moore's Early, which is about the first week in September. The vine is spoken of as very hardy and a stronger grower, with great resistant power against fungi. The quality of the fruit is excellent, and it has no foxiness. The berries have a firm black skin, with a heavy bloom. They are larger than those of the Delaware, and cling well to the stem. Mr. Caywood used to call this Grape the Black Delaware.

An admirable perennial plant for autumn flowering is Aconitum autumnale, which is now in bloom. Its branched spike of very dark blue or purple flowers, which continue in bloom for a long time, rises to a height of three feet, and the deep color shows particularly well just now if these plants are used as a background for the white-flowered Japanese Anemone. This Aconite is also a good companion plant for the lower-growing Sunflowers, as their colors harmonize well. It is perfectly hardy, and it has tuberous roots, which are easily divided. In good seasons it ripens seed here, and if this is planted at once it will germinate more certainly than imported seed.

Mr. Louis Späth, of the Rixdorf Nurseries, Berlin, sends us flowering and fruiting specimens of Berberis Fremontii, an evergreen species from western Colorado and Utah, where it sometimes attains a height of eight or ten feet. It is a species with glaucous pinnate leaves, bright yellow flowers, and bright orange-red fruit three-quarters of an inch in diameter. So far as we know, the plants at Rixdorf are the first which have produced fruit in cultivation; indeed, the size and color of the fruit do not appear to have been known before. It was first described as dark blue, and later by Mr. Watson, from collections made in southern Utah by Dr. Edward Palmer, as "greenish" yellow. If this beautiful species thrives in our gardens, it will be an important addition to the rather short list of broad-leaved evergreens which can be grown here.

We have just seen a large mass of the white-flowered variety of Rosa rugosa, and the dark green foliage was starred with a good many flowers. Indeed, there has been hardly a day, even through the driest weather of this summer, when these plants were entirely without bloom. In a few weeks their rich green foliage will turn to brilliant crimson and orange, and their abundant fruit is already deeply colored. No doubt, many useful hybrids will be raised from this species, but it will be fortunate if any of them possesses as many qualities which go to make a valuable garden-plant as the parent plant. It is unfortunate that many plants have been sold as Rosa rugosa which are probably hybrids of some inferior Rose. If they are a variety of this species they are greatly inferior to the type. Buyers should be careful to know that they get plants of the best strain.

From Monsieur Maurice L. de Vilmorin, of Paris, the Arnold Arboretum has recently received seeds of one hundred species of trees and shrubs collected last autumn in Szechuen, a province of western China, by the French missionaries resident there. Szechuen is one of the richest temperate regions in the world in trees and shrubs, and as comparatively few of them have ever been cultivated in American or European gardens, it is probable that this collection contains some valuable novelties. Among the seeds are those of a Cercidiphyllum, a genus heretofore only known in Japan in a single species. The existence of this same species in western China would not be remarkable, as it is now known that many Japanese plants have an extended continental range; or it may prove to be a second species of this most interesting genus.

Fire and Water recommends that Willow-wood be used for floors in this country, as it is in England, because it is of slow, or not ready, combustion. It contains no resin or essential oil, is fine-grained and takes a smooth finish, and so is suitable for inside work and would make good sheathing. It may be said that it is not available here because we have but little Willow. It is true we have no native varieties of any size, but the English White Willow is naturalized here. It is easily propagated by cuttings and does not require a wet soil, as many suppose. There has been a prejudice against its wood, owing to its supposed lack of durability when exposed to the weather, and because it is soft and was not needed when white pine was abundant. Now, however, as our forests are being rapidly cut off, and we are looking for something to take their place, the value of the Willow is worth considering. It is a rapid grower, and our foresters might well give their attention to it.

The large and handsome Spanish onions, which have been coming to this city in increasing quantities for the last half-dozen years, are now cheaper than they have ever been known here. These vegetables are grown mainly near Valencia, in Spain, and the first shipments this year, which came by the way of England, were harvested too early and were therefore watery. Being liable to quick decay they were hurried upon the market and sold for low prices. The first direct importation was also off-grade in quality, and this set the price for the season very low, so that in many auction sales the price has barely covered the freight and duty, to say nothing of the commissions and cost of packing. The duty of forty cents on a bushel of fifty-six pounds, together with the freight, commission and cost abroad, brings the actual value to the importer about eighty cents a crate laid down, and, therefore, when prices range from fifty-five cents to $1.00 a crate the trade has been a disastrous one. Together with what has already arrived and what is expected, the imports this year will amount to 150,000 crates, or about 87,500 bushels. Attempts to raise this Spanish Onion in California and other parts of the country from seed purchased in Spain have generally proved unsuccessful, as the vegetables when grown here do not differ much from the ordinary domestic onion. It seems that a Castilian climate and soil is necessary for the production of this delightful product. For this reason, and also because these bulbs do not come into conflict with home vegetables, a strong effort is now on foot to have the duty decreased to a more reasonable rate.

The supply of peaches continues abundant, choice Morris Whites and Smocks selling for seventy-five cents a basket, while good fruit is to be had at fifty cents. Clairgeau and Bosc pears, if of first quality, bring four dollars and a half a barrel, and so do choice Bartletts; but as most of these are coming from cold-storage houses, the quality is often inferior. Plums of various kinds from California, including delicious Kelseys and other Japanese sorts, continue as plentiful as ever. From this state, only the varieties used for canning and preserving are seen in this market, and as quality is not important in this class of plums they are not quoted by name. Plums from western New York of high flavor, like Reine Claude and Peters' Yellow Gage, are taken by the Philadelphia market, where ten-pound baskets bring a dollar each. Mr. E. S. Willard, of Geneva, reports the plum crop of that section as not more than twenty per cent. of a full yield. Beautiful Flame Tokay grapes from California, with Black Malvoise, Purple Cornichons and White Malagas are selling on sidewalk-stands almost as cheap as Delawares. The first quinces are appearing, and can be had for a dollar a basket. A few boxes of Florida oranges, forerunners of the regular crop, and known as "drops," came in last week. The fruit is small, and sells at two dollars a box wholesale, while splendid pineapples from the same state, said to be grown under glass, are in eager demand at fifty cents each wholesale. Red nectarines, of larger size and better quality than the earlier arrivals, are selling at forty cents a dozen. They come from California, and this state is also sending fresh figs, which are quite inferior to the fruit grown under glass in the east and seen occasionally in the fancy-fruit stores.

The death is announced of the famous rosarian, Jean Baptiste Guillot, of Lyons, in his sixty-sixth year. Monsieur Guillot was one of the most successful breeders of Roses of our day, and from his seed-beds sprang such well-known Roses as Catherine Mermet, Madame de Watteville, Madame Hoste, Ernest Metz, Gloire Lyonnaise, La France, Etoile de Lyon, Horace Vernet and Mademoiselle Eugénie Verdier. He came of a family of Rose-growers, and it was his father who, fifty years ago, produced the Rose Géant des Batailles, which in its time was as great a triumph as that of La France and Catherine Mermet.